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AMENDMENTS TO THE CLAIMS

1 1. (canceled)

1 2. (canceled)

1 3. (canceled)

1 4. (previously presented) A method as recited in Claim 8, wherein:

2 the second lock further comprises a reference number set to a predetermined initial
3 value,

4 the method further comprising the steps of:

5 receiving the second lock to be released having data indicating the particular resource
6 object;

7 determining whether the reference number of the second lock to be released

8 substantially equals the predetermined initial value of the reference number;
9 and

10 if it is determined the reference number of the second lock to be released does not
11 substantially equal the predetermined initial value, then replacing the value of
12 the reference number in the second lock with a difference substantially equal
13 to the value of the reference number in the second lock minus a predetermined
14 reference change value.

1 5. (canceled)

1 6. (previously presented) A method as recited in Claim 4, further comprising, if it is
2 determined the reference number of the second lock to be released substantially

3 equals the predetermined initial value, then deleting the second lock for the particular
4 resource object.

1 7. (canceled)

1 8. (previously presented) A method of updating a resource object using optimistic locks,
2 the method comprising the computer-implemented steps of:
3 receiving from a client process a request to update a particular resource object;
4 sending to a lock manager process a request for a first lock for access to the particular
5 resource object, the request including data indicating an optimistic lock type;

6 receiving the first lock for access to the particular resource object, the first lock
7 including data indicating the resource object, the optimistic lock type and a
8 first value for a version number related to a number of changes to the resource
9 object since the lock manager generated a lock data structure corresponding to
10 the resource object; and

11 updating the resource object by

12 sending to a lock manager process a request for a second lock for access to the
13 particular resource object, the request including data indicating the
14 resource object identification and an exclusive lock type;

15 receiving the second lock for access to the particular resource object, the
16 second lock including data indicating the resource object
17 identification, the exclusive lock type and a second value for the
18 version number;

19 determining whether the second value for the version number substantially
20 equals the first value for the version number; and
21 if the second value substantially equals the first value, then
22 committing an updated resource object to the resource, and
23 replacing the second value for the version number in the second lock
24 with a third value for the version number, the third value
25 computed by adding the second value and a predetermined
26 version change value.

- 1 9. (original) The method as recited in Claim 8, further comprising, if the second value
2 does not substantially equal the first value, then sending a message to the client
3 process, the message indicating that the resource object was not updated.
- 1 10. (previously presented) The method as recited in Claim 8, further comprising sending
2 to the lock manager process a first release message to release the first lock.
- 1 11. (previously presented) The method as recited in Claim 10, further comprising sending
2 to the lock manager process a second release message to release the second lock.
- 1 12. (previously presented) The method as recited in Claim 9, further comprising sending
2 to the lock manager process a release message to release the second lock, the release
3 message including data indicating the third value of the version number in the second
4 lock and the exclusive lock type, wherein the third value of the version number is
5 used by the lock manager to replace the second value of the version number in the
6 lock data structure.

1 13. (canceled)

1 14. (previously presented) A computer-readable medium carrying one or more sequences
2 of instructions for updating a resource object, which instructions, when executed by
3 one or more processors, cause the one or more processors to carry out the steps of:
4 receiving from a client process a request to update a particular resource object;
5 sending to a lock manager process a request for a first lock for access to the particular
6 resource object, the request including data indicating an optimistic lock type;
7 receiving the first lock for access to the particular resource object, the first lock
8 including data indicating the resource object, the optimistic lock type and a
9 first value for a version number related to a number of changes to the resource
10 object since the lock manager generated a lock data structure corresponding to
11 the resource object; and
12 updating the resource object by
13 sending to a lock manager process a request for a second lock for access to the
14 particular resource object, the request including data indicating the
15 resource object identification and an exclusive lock type;
16 receiving the second lock for access to the particular resource object, the
17 second lock including data indicating the resource object
18 identification, the exclusive lock type and a second value for the
19 version number;
20 determining whether the second value for the version number substantially
21 equals the first value for the version number; and

22 if the second value substantially equals the first value, then
23 committing an updated resource object to the resource, and
24 replacing the second value for the version number in the second lock
25 with a third value for the version number, the third value
26 computed by adding the second value and a predetermined
27 version change value.

1 15. (canceled)

1 16. (previously presented) An apparatus for updating a resource object, comprising:
2 a processor;
3 one or more stored sequences of instructions which, when executed by the processor,
4 cause the processor to carry out the steps of:
5 receiving from a client process a request to update a particular resource object;
6 sending to a lock manager process a request for a first lock for access to the
7 particular resource object, the request including data indicating an
8 optimistic lock type;
9 receiving the first lock for access to the particular resource object, the first
10 lock including data indicating the resource object, the optimistic lock
11 type and a first value for a version number related to a number of
12 changes to the resource object since the lock manager generated a lock
13 data structure corresponding to the resource object; and
14 updating the resource object by

15 sending to a lock manager process a request for a second lock for
16 access to the particular resource object, the request including
17 data indicating the resource object identification and an
18 exclusive lock type;
19 receiving the second lock for access to the particular resource object,
20 the second lock including data indicating the resource object
21 identification, the exclusive lock type and a second value for
22 the version number;
23 determining whether the second value for the version number
24 substantially equals the first value for the version number; and
25 if the second value substantially equals the first value, then
26 committing an updated resource object to the resource, and
27 replacing the second value for the version number in the second
28 lock with a third value for the version number, the third
29 value computed by adding the second value and a
30 predetermined version change value.

· 1 17. (canceled)

· 1 18. (currently amended) An apparatus for updating a resource object, comprising:
2 a means for receiving from a client process a request to update a particular resource
3 object;

4 a means for sending to a lock manager process a request for a first lock for access to
5 the particular resource object, the request including data indicating an
6 optimistic lock type;
7 a means for receiving the first lock for access to the particular resource object, the
8 first lock including data indicating the resource object, the optimistic lock type
9 and a first value for a version number related to a number of changes to the
10 resource object since the lock manager generated a lock data structure
11 corresponding to the resource object; and
12 a means for updating the resource object, including
13 a means for sending to a lock manager process a request for a second lock for
14 access to the particular resource object, the request including data
15 indicating the resource object identification and an exclusive lock type;
16 a means for receiving the second lock for access to the particular resource
17 object, the second lock including data indicating the resource object
18 identification, the exclusive lock type and a second value for the
19 version number;
20 a means for determining whether the second value for the version number
21 substantially equals the first value for the version number;
22 a means for committing an updated resource object to the resource if the
23 second value substantially equals the first value; and
24 a means for replacing the second value for the version number in the second
25 lock with a third value for the version number if the second value

26 substantially equals the first value, the third value computed by adding
27 the second value and a predetermined version change value.

1 19. (previously presented) The computer-readable medium as recited in Claim 14,
2 wherein the instructions, when executed by one or more processors, cause the one or
3 more processors to carry out the step of:
4 if the second value does not substantially equal the first value, then sending a message
5 to the client process, the message indicating that the resource object was not
6 updated.

1 20. (previously presented) The computer-readable medium as recited in Claim 14,
2 wherein the instructions, when executed by one or more processors, cause the one or
3 more processors to carry out the step of:
4 sending to the lock manager process a first release message to release the first lock.

1 21. (previously presented) The computer-readable medium as recited in Claim 20,
2 wherein the instructions, when executed by one or more processors, cause the one or
3 more processors to carry out the step of:
4 sending to the lock manager process a second release message to release the second
5 lock.

1 22. (previously presented) The computer-readable medium as recited in Claim 19,
2 wherein the instructions, when executed by one or more processors, cause the one or
3 more processors to carry out the step of:

4 sending to the lock manager process a release message to release the second lock, the
5 release message including data indicating the third value of the version
6 number in the second lock and the exclusive lock type, wherein the third value
7 of the version number is used by the lock manager to replace the second value
8 of the version number in the lock data structure.

1 23. (previously presented) The apparatus as recited in Claim 16, wherein the instructions,
2 when executed by one or more processors, cause the one or more processors to carry
3 out the step of:
4 if the second value does not substantially equal the first value, then sending a message
5 to the client process, the message indicating that the resource object was not
6 updated.

1 24. (previously presented) The apparatus as recited in Claim 16, wherein the instructions,
2 when executed by one or more processors, cause the one or more processors to carry
3 out the step of:
4 sending to the lock manager process a first release message to release the first lock.

1 25. (previously presented) The apparatus as recited in Claim 24, wherein the instructions,
2 when executed by one or more processors, cause the one or more processors to carry
3 out the step of:
4 sending to the lock manager process a second release message to release the second
5 lock.

- 1 26. (previously presented) The apparatus as recited in Claim 23, wherein the instructions,
2 when executed by one or more processors, cause the one or more processors to carry
3 out the step of:
4 sending to the lock manager process a release message to release the second lock, the
5 release message including data indicating the third value of the version
6 number in the second lock and the exclusive lock type, wherein the third value
7 of the version number is used by the lock manager to replace the second value
8 of the version number in the lock data structure.

- 1 27. (previously presented) The apparatus as recited in Claim 18, further comprising:
2 means for sending a message to the client process if the second value does not
3 substantially equal the first value, the message indicating that the resource
4 object was not updated.

- 1 28. (previously presented) The apparatus as recited in Claim 18, further comprising:
2 means for sending to the lock manager process a first release message to release the
3 first lock.

- 1 29. (previously presented) The apparatus as recited in Claim 28, further comprising:
2 means for sending to the lock manager process a second release message to release
3 the second lock.

- 1 30. (previously presented) The apparatus as recited in Claim 27, further comprising:
2 means for sending to the lock manager process a second release message to release the
3 second lock, the second release message including data indicating the third value

4 of the version number in the second lock and the exclusive lock type, wherein
5 the third value of the version number is used by the lock manager to replace the
6 second value of the version number in the lock data structure.

1 31. (previously presented) The computer-readable medium of Claim 14, wherein the
2 second lock further comprises a reference number set to a predetermined initial value,
3 and wherein the instructions cause the one or more processors to perform the steps of:
4 receiving the second lock to be released having data indicating the particular resource
5 object;

6 determining whether the reference number of the second lock to be released
7 substantially equals the predetermined initial value of the reference number;
8 and

9 if it is determined the reference number of the second lock to be released does not
10 substantially equal the predetermined initial value, then replacing the value of
11 the reference number in the second lock with a difference substantially equal
12 to the value of the reference number in the second lock minus a predetermined
13 reference change value.

1 32. (canceled)

1 33. (currently amended) A computer-readable medium of Claim 32 31, wherein the
2 instructions cause the one or more processors to perform the step of, if it is
3 determined the reference number of the second lock to be released substantially
4 equals the predetermined initial value, then deleting the second lock for the particular
5 resource object.

- 1 34. (previously presented) The apparatus of Claim 16, wherein the second lock further
- 2 comprises a reference number set to a predetermined initial value, and wherein the
- 3 instructions cause the one or more processors to perform the steps of:
- 4 receiving the second lock to be released having data indicating the particular resource
- 5 object;
- 6 determining whether the reference number of the second lock to be released
- 7 substantially equals the predetermined initial value of the reference number; and
- 8 if it is determined the reference number of the second lock to be released does not
- 9 substantially equal the predetermined initial value, then replacing the value of
- 10 the reference number in the second lock with a difference substantially equal to
- 11 the value of the reference number in the second lock minus a predetermined
- 12 reference change value.
- 1 35. (previously presented) The apparatus of Claim 34, wherein the instructions cause the
- 2 one or more processors to perform the steps of:
- 3 if it is determined the reference number of the second lock to be released substantially
- 4 equals the predetermined initial value, then deleting the second lock for the
- 5 particular resource object.
- 1 36. (previously presented) The apparatus of Claim 18, wherein the second lock further
- 2 comprises a reference number set to a predetermined initial value, the apparatus further
- 3 comprising:
- 4 means for receiving the second lock to be released having data indicating the particular
- 5 resource object;

6 means for determining whether the reference number of the second lock to be released
7 substantially equals the predetermined initial value of the reference number; and
8 means for replacing the value of the reference number in the second lock with a
9 difference substantially equal to the value of the reference number in the second
10 lock minus a predetermined reference change value, if it is determined the
11 reference number of the second lock to be released does not substantially equal
12 the predetermined initial value.

1 37. (previously presented) The apparatus of Claim 36, further comprising:
2 means for deleting the second lock for the particular resource object if it is determined
3 the reference number of the second lock to be released substantially equals the
4 predetermined initial value.

1 38. (withdrawn) A method for managing access to a resource, the method comprising the
2 computer-implemented steps of:
3 receiving a request for access to a particular resource to make an update to the resource;
4 generating a lock associated with the particular resource, wherein the lock comprises
5 information that indicates a first value for a version number that is equal to a
6 value for a version number associated with the particular resource and is related
7 to whether the particular resource has been updated;
8 receiving a request to commit the update to the particular resource;
9 determining whether a current value for the version number associated with the
10 particular resource is equal to the first value for the version number indicated in
11 the lock; and

12 if the current value for the version number is equal to the first value for the version
13 number, then converting the lock to a different type of lock and committing the
14 update.

1 39. (withdrawn) The method of Claim 38, wherein the step of converting the lock comprises
2 converting the lock to an exclusive lock.

1 40. (withdrawn) A computer-readable medium carrying one or more sequences of
2 instructions for managing access to a resource, which instructions, when executed by
3 one or more processors, cause the one or more processors to carry out the steps of:
4 receiving a request for access to a particular resource to make an update to the resource;
5 generating a lock associated with the particular resource, wherein the lock comprises
6 information that indicates a first value for a version number that is equal to a
7 value for a version number associated with the particular resource and is related
8 to whether the particular resource has been updated;
9 receiving a request to commit the update to the particular resource;
10 determining whether a current value for the version number associated with the
11 particular resource is equal to the first value for the version number indicated in
12 the lock; and
13 if the current value for the version number is equal to the first value for the version
14 number, then converting the lock to a different type of lock and committing the
15 update.

1 41. (withdrawn) The computer-readable medium of Claim 40, wherein the instructions
2 cause the one or more processors to perform the step of converting the lock by
3 converting the lock to an exclusive lock.

1 42. (withdrawn) An apparatus for managing access to a resource, comprising:
2 a processor;
3 one or more stored sequences of instructions which, when executed by the processor,
4 cause the processor to carry out the steps of:
5 receiving a request for access to a particular resource to make an update to the
6 resource;
7 generating a lock associated with the particular resource, wherein the lock
8 comprises information that indicates a first value for a version number
9 that is equal to a value for a version number associated with the
10 particular resource and is related to whether the particular resource has
11 been updated;
12 receiving a request to commit the update to the particular resource;
13 determining whether a current value for the version number associated with the
14 particular resource is equal to the first value for the version number
15 indicated in the lock; and
16 if the current value for the version number is equal to the first value for the
17 version number, then converting the lock to a different type of lock and
18 committing the update.

1 43. (withdrawn) The apparatus of Claim 42, wherein the instructions cause the processor to
2 perform the step of converting the lock by converting the lock to an exclusive lock.

1 44. (withdrawn) An apparatus for managing access to a resource, comprising:
2 means for receiving a request for access to a particular resource to make an update to the
3 resource;
4 means for generating a lock associated with the particular resource, wherein the lock
5 comprises information that indicates a first value for a version number that is
6 equal to a value for a version number associated with the particular resource and
7 is related to whether the particular resource has been updated;
8 means for receiving a request to commit the update to the particular resource;
9 means for determining whether a current value for the version number associated with
10 the particular resource is equal to the first value for the version number indicated
11 in the lock; and
12 means for converting the lock to a different type of lock and committing the update if
13 the current value for the version number is equal to the first value for the version
14 number.